Course Outcomes for E&TC (2019 Pattern)

SE AY 2020-21

SE – Sem I

Subject 1: Engineering Mathematics III

At the end of this course, Students will be able to

CO207005.1	Solve higher order linear differential equation using appropriate techniques for modelling, analyzing of electrical circuits and control systems.
CO207005.2	Apply concept of Fourier transform & Z-transform and its applications to continuous & discrete systems, signal & image processing and communication systems
CO207005.3	Obtain Interpolating polynomials, numerically differentiate and integrate functions, numerical solutions of differential equations using single step and multi-step iterative methods used in modern scientific computing
CO207005.4	Perform vector differentiation & integration, analyze the vector fields and apply to electro- magnetic fields & wave theory.
CO207005.5	Analyze Complex functions, Conformal mappings, Contour integration applicable to electrostatics, digital filters, signal and image processing.

Subject 2: Electronic Circuits

At the end of this course, Students will be able to

CO204181.1	Assimilate the physics, characteristics and parameters of E-MOSFET towards its application as an amplifier.
CO204181.2	Design MOSFET amplifiers, with and without feedback, & MOSFET oscillators, for given specifications.
CO204181.3	Analyze and assess the performance of linear and switching regulators, with their variants, towards applications in regulated power supplies.
CO204181.4	Explain internal schematic of Op-Amp and define its performance parameters.
CO204181.5	Design, Build and test Op-amp based analog signal processing and conditioning circuits towards various real time applications.
CO204181.6	Understand and compare the principles of various data conversion techniques and PLL with their applications.

Subject 3: Digital Circuits

At the end of this course, Students will be able to

CO204182.1	Apply knowledge of digital logic families for designing digital circuits
CO204182.2	Use the basic logic gates and various reduction techniques of digital logic circuit in detail.
CO204182.3	Analyze, design and implement combinational logic circuits.
CO204182.4	Analyze, design and implement sequential circuits
CO204182.5	Design and implement sequence detector using Mealy and Moore machines.

CO204182.6	Analyze digital system design using PLD

Electrical Circuits

At the end of this course, Students will be able to

CO204183.1	Analyze the simple DC and AC circuit with circuit simplification techniques
CO204183.2	Formulate and analyze driven and source free RL and RC circuits.
CO204183.3	Formulate & determine network parameters for given network and analyze the given network using Laplace Transform to find the network transfer function.
CO204183.4	Explain construction, working and applications of DC Machines / Single Phase & Three Phase AC Motors.
CO204183.5	Explain construction, working and applications of special purpose motors & understand motors used in electrical vehicles.
CO204183.6	Analyze and select a suitable motor for different applications.

Data structures

At the end of this course, Students will be able to

CO204184.1	Implement loops, functions, pointers and files by writing programs in C.
CO204184.2	Implement searching and sorting algorithms and analyze their time complexities.
CO204184.3	Develop applications of stacks and queues using array.
CO204184.4	Implement data structures such as stacks and queues using linked list and analyze the performance of both.
CO204184.5	Design different types of Binary Trees (height balanced, BST) and analyze its time complexity.
CO204184.6	Apply the knowledge of graph for solving the problems of spanning tree and shortest path algorithm.

Electronic Circuit Lab

At the end of this course, Students will be able to

CO204185.1	Build & test performance parameters of E-MOSFET towards its application as amplifier.
CO204185.2	Build & test performance of linear regulators, towards applications in regulated power supplies.
CO204185.3	Measure following Op- amp parameters & Compare with specifications given in data sheet
CO204185.4	Design, Build and test Op-amp based analog signal processing and conditioning circuits towards various real time applications.

Digital circuits Lab

At the end of this course, Students will be able to

CO304186.1	Apply knowledge of digital logic families for designing digital circuits
CO 04186.2	Use the basic logic gates and various reduction techniques of digital logic circuit in detail.
CO 04186.3	Analyze, design and implement combinational logic circuits.
CO 04186.4	Analyze, design and implement sequential circuits
CO 04186.5	Design, simulate, test and verify combinational and sequential logic circuits.

Electrical Circuit Lab

At the end of this course, Students will be able to

CO204187.1	Analyze the simple DC and AC circuit with circuit simplification techniques
CO204187.2	Formulate and analyze driven and source free RL and RC circuits.
CO204187.3	Formulate & determine network parameters for given network and analyze the given network using Laplace Transform to find the network transfer function.
CO204187.4	Explain construction, working and applications of DC Machines / Single Phase & Three Phase AC Motors.
CO204187.5	Explain construction, working and applications of special purpose motors & understand motors used in electrical vehicles.
CO204187.6	Analyze and select a suitable motor for different applications.

Data Structures Lab

At the end of this course, Students will be able to

CO204188.1	Implement loops, functions, pointers and files by writing programs in C.
CO204188.2	Implement searching and sorting algorithms and analyze their time complexities.
CO204188.3	Develop applications of stacks and queues using array.
CO204188.4	Implement data structures such as stacks and queues using linked list and analyze the performance of both.
CO204188.5	Design different types of Binary Trees (height balanced, BST) and analyze its time complexity.
CO204188.6	Apply the knowledge of graph for solving the problems of spanning tree and shortest path algorithm.

Electronic Skill Development

At the end of this course, Students will be able to

CO204189.1	Identify and analyze the appropriate electronic principle for the task.
CO204189.2	Interpret and describe specifications, features and capabilities of electronic instruments.

CO204189.3	Conduct circuit simulation using suitable software.
CO204189.4	Design a Printed Circuit Board layout and assemble components on Printed CircuitBoard.
CO204189.5	Understand and compare the various types of Batteries.
CO204189.6	Gained knowledge about solar power generation systems.

Signals & Systems

At the end of this course, Students will be able to

CO204191.1	Identify, classify basic signals and perform operations on signals.
CO204191.2	Identify, Classify the systems based on their properties in terms of input output relation and in terms of impulse response and will be able to determine the convolution between to signals
CO204191.3	Analyze and resolve the signals in frequency domain using Fourier series and Fourier Transform
CO204191.4	Resolve the signals in complex frequency domain using Laplace Transform, and will be able to apply and analyze the LTI systems using Laplace Transforms.
CO204191.5	Define and Describe the probability, random variables and random signals. Compute the probability of a given event, model, compute the CDF and PDF
CO204191.6	Compute the mean, mean square, variance and standard deviation for given random variables using PDF.

Control Systems

At the end of this course, Students will be able to

CO204192.1	Determine the (absolute) stability of a closed-loop control system.
CO204192.2	Perform time domain analysis of control systems required for stability analysis.
CO204192.3	Perform frequency domain analysis of control systems required for stability analysis.
CO204192.4	Apply root-locus, frequency plots technique to analyze control systems.
CO204192.5	Express and solve system equations in state variable form.
CO204192.6	Differentiate between various digital controllers and understand the role of the controllers in Industrial automation.

Principles of Communication Systems

At the end of this course, Students will be able to

CO204193.1	To compute & compare the bandwidth and transmission power requirements by analyzing time and frequency domain spectra of signal required for modulation schemes under study
CO204193.2	Describe and analyze the techniques of generation, transmission and reception of Amplitude Modulation Systems.

CO204193.3	Explain FM generation and detection of communication systems and compare with AM systems.
CO204193.4	Exhibit the importance of Sampling Theorem and correlate with Pulse Modulation technique (PAM, PWM, and PPM).
CO204193.5	Characterize the quantization process and elaborate digital representation techniques (PCM, DPCM, DM and ADM).
CO204193.6	Illustrate waveform coding, multiplexing and synchronization techniques and articulate their importance in baseband digital transmission

Object Oriented Programming

At the end of this course, Students will be able to

CO204194.1	Design, develop, test, and debug simple programs using Tokens, Expressions and Control Structures in an object-oriented programming language
CO204194.2	Implement class-object mechanism with the help of Constructors and Destructors in C++.
CO204194.3	Implement Operator overloading and friend functions in C++
CO204194.4	Apply the concepts of classes, methods inheritance and polymorphism to write programs C++.
CO204194.5	Apply Templates, Namespaces and Exception Handling concepts to write programs in C++.
CO204194.6	Describe and use of File handling in C++.

Signals & Control System Lab

At the end of this course, Students will be able to

CO204195.1	Generate ,analyze different signals and plot the same in time and frequency domain using matlab.
CO204195.2	Write a program to record speech and music signals, sketch it in time domain,its amplitude spectrum and phase spectrum
CO204195.3	Determine the stability analysis of a closed loop control system with the help of simulation.
CO204195.4	Differentiate between various control actions on the step response of feedback control system

Principle of Communication Systems Lab

At the end of this course, Students will be able to

CO204196.1	Demonstrate different analog and pulse modulation techniques
CO204196.2	Study different digital modulation and demodulation techniques

Object Oriented Programming Lab

At the end of this course, Students will be able to

CO204197.1	Design, develop, test, and debug simple programs using Tokens, Expressions and Control Structures in an object-oriented programming language
CO204197.2	Implement class-object mechanism with the help of Constructors and Destructors in C++.
CO204197.3	Implement Operator overloading and friend functions in C++
CO204197.4	Apply the concepts of classes, methods inheritance and polymorphism to write programs C++.
CO204197.5	Apply Templates, Namespaces and Exception Handling concepts to write programs in C++.
CO204197.6	Describe and use of File handling in C++.

Data Analytics Lab

At the end of this course, Students will be able to

CO204198.1	To introduce to students fundamentals of data science.
CO204198.2	To introduce to students various Python packages related to data science.
CO204198.3	To make student write Python programs related to data sequences using NumPy and Pandas.
CO204198.4	To make student write Python programs related to data frames using NumPy and Pandas.

Employability Skill Development

At the end of this course, Students will be able to

CO204199.1	Define personal and career goals using introspective skills and SWOC assessment. Outline and evaluate short-term and long-term goals.
CO204199.2	Develop effective communication skills, self- management attributes, problem solving abilities and team working & building capabilities in order to fetch employment opportunities and further succeed in the workplace.
CO204199.3	Develop listening, reading, writing, and speaking skills and understand fundamentals of English grammar
CO204199.4	Understand Corporate Culture and Develop practically deployable skill set involving critical thinking, effective presentations and leadership qualities to hone the opportunities of employability and excel in the professional environment.
CO204199.5	Comprehend the importance of professional ethics, etiquettes & morals and demonstrate sensitivity towards it throughout a certified career.
CO204199.6	Develop Quantitative Ability & Logical Reasoning skills.

Project Based Learning

At the end of this course, Students will be able to

CO204200.1	Identify the real-world problem (possibly of interdisciplinary nature) through a rigorous literature survey and formulate / set relevant aim and objectives.
CO204200.2	Contribute to society through proposed solution by strictly following professional ethics and safety measures
CO204200.3	Propose a suitable solution based on the fundamentals of electronics and communication engineering by possibly the integration of previously acquired knowledge
CO204200.4	Analyze the results and arrive at valid conclusion
CO204200.5	Use of technology in proposed work and demonstrate learning in oral and written form.
CO204200.6	Develop ability to work as an individual and as a team member.

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Subject 1: Digital Communication

At the end of this course, Students will be able to

CO304181.1	Apply the statistical theory for describing various signals in a communication system.
CO304181.2	Analyze the performance of the pass band digital communication system in terms of error probability and power spectra.
CO304181.3	Understand and explain various digital modulation techniques, OFDM principles and its Implementation.
CO304181.4	Describe and analyze the digital communication system with spread spectrum modulation
CO304181.5	Analyze a communication system using information theoretic approach and Design a source coding scheme for data compression
CO304181.6	Design channel codes and verify encoding and decoding of the data.

Electromagnetic Field Theory

At the end of this course, Students will be able to

CO304182.1	Evaluate electrostatic field parameters and their distributions in different media
CO304182.2	Evaluate magnetostatics field parameters and their distributions in different media
CO304182.3	Apply boundary conditions to different media and determine electromagnetic fields at the interface of two different media.
CO304182.4	Interpret the electromagnetic problem and solve using Maxwell's equations.

CO304182.5	Analyze problems related to transmission lines and uniform plane wave propagation using Maxwell's equations.
CO304182.6	Carry out a detailed study; interpret the relevance and applications of Electromagnetics.

Database Management

At the end of this course, Students will be able to

CO304183.1	Implement the underlying concepts of a database system.
CO304183.2	Design and implement a database schema for a given problem using data model.
CO304183.3	Find solutions to a wide range of query and update problems using SQL/DML/DDL commands.
CO304183.4	Understand database transactions management.
CO304183.5	Understand various parallel database architectures and its applications.
CO304183.6	Understand various distributed databases and its applications.

Microcontrollers

At the end of this course, Students will be able to

CO304184.1	Understand the fundamentals of microcontroller and programming
CO304184.2	Interface various electronic components with microcontrollers
CO304184.3	Analyze the features of PIC 18F XXXX
CO304184.4	Describe the programming details in peripheral support.
CO304184.5	Develop interfacing models according to applications.
CO304184.6	Evaluate the serial communication details and interfaces.

Elective - I Fundamentals of JAVA Programming

At the end of this course, Students will be able to

CO304185.1	Understand the basic principles of Java programming language
CO304185.2	Apply the concepts of classes and objects to write programs in Java
CO304185.3	Demonstrate the concepts of methods & Inheritance
CO304185.4	Use the concepts of interfaces & packages for program implementation
CO304185.5	Understand multithreading and Exception handling in Java to develop robust programs
CO304185.6	Use Graphics class, AWT packages and manage input and output files in Java

Elective - I Computer Networks

At the end of this course, Students will be able to

CO304185.1	Design LAN using appropriate networking architecture, topologies, transmission media, and networking devices

CO304185.2	Describe the working of controlling techniques for flawless data communication using data link layer protocols
CO304185.3	Compare the functions of network layer, various switching techniques and internet protocol addressing.
CO304185.4	Distinguish different interior and exterior, unicasting and multicasting protocols.
CO304185.5	Analyze data flow using TCP/UDP Protocols, congestion control techniques for QoS.
CO304185.6	Select and use the protocols at application layer.

Skill Development

At the end of this course, Students will be able to

CO304190.1	Student should recognize the need to engage in independent and life-long learning in required skill sets.
CO304190.2	Student needs to experience the impact of industries on society by visiting different industries and understand the importance of industrial products for analog and digital circuits and systems.
CO304190.3	Student has to make use of the modern electronic and IT Engineering Tools and Technologies for solving electronic engineering problems.
CO304190.4	Student would be able to communicate effectively at different technical and administrative levels.
CO304190.5	Student will exhibit leadership skills both as an individual and as a member in a team in multidisciplinary environment.

Cellular Networks

At the end of this course, Students will be able to

CO304192.1	Understand fundamentals of wireless communications.
CO304192.2	Discuss and study OFDM and MIMO concepts..
CO304192.3	Elaborate fundamentals mobile communication.
CO304192.4	Describes aspects of wireless system planning.
CO304192.5	Understand of modern and futuristic wireless networks architecture
CO304192.6	Summarize different issues in performance analysis

Project Management

At the end of this course, Students will be able to

CO304193.1	Apply the fundamental knowledge of project management for effectively handling the projects.
CO304193.2	Identify and select the appropriate project based on feasibility study and undertake its effective planning
CO304193.3	Assimilate effectively within the organizational structure of project and handle project management related issues in an efficient manner.
CO304193.4	Apply the project scheduling techniques to create a Project Schedule Plan and accordingly utilize the resources to meet the project deadline.

CO304193.5	Identify and assess the project risks and manage finances in line with Project Financial Management Process.
CO304193.6	Develop new products assessing their commercial viability and develop skill sets for becoming successful entrepreneurs while being fully aware of the legal issues related to Product development and Entrepreneurship.

Power Devices & Circuits

At the end of this course, Students will be able to

CO304194.1	To differentiate based on the characteristic parameters among SCR, GTO, MOSFET & IGBT and identify suitability of the power device for certain applications and understand the significance of device ratings.
CO 304194.2	To design triggering / driver circuits for various power devices.
CO 304194.3	To evaluate and analyze various performance parameters of the different converters and its topologies.
CO 304194.4	To understand significance and design of various protections circuits for power devices.
CO 304194.5	To evaluate the performance of uninterruptible power supplies, switch mode power supplies and battery.
CO 304194.6	To understand case studies of power electronics in applications like electric vehicles, solar systems etc.

Elective-II 1) Advanced JAVA Programming

At the end of this course, Students will be able to

CO304195.1	Design and develop GUI applications using Applets.
CO304195.2	Apply relevant AWT/ swing components to handle the given event.
CO304195.3	Design and develop GUI applications using Abstract Windowing Toolkit (AWT), Swing and Event Handling.
CO304195.4	Learn to access database through Java programs, using Java Database Connectivity (JDBC)
CO304195.5	Invoke the remote methods in an application using Remote Method Invocation (RMI)
CO304195.6	Develop program for client /server communication using Java Networking classes.

Elective-II 2) Network Security

At the end of this course, Students will be able to

CO304195.1	Analyze attacks on computers and computer security.
CO304195.2	Demonstrate knowledge of cryptography techniques.
CO304195.3	Illustrate various Symmetric and Asymmetric keys for Ciphers
CO304195.4	Evaluate different Message Authentication Algorithms and Hash Functions
CO304195.5	Get acquainted with various aspects of E-Mail Security
CO304195.6	Assimilate various aspects of Web Security

Internship**

At the end of this course, Students will be able to

CO304199.1	To develop professional competence through internship.
CO304199.2	To apply academic knowledge in a personal and professional environment.
CO304199.3	To build the professional network and expose students to future employees.
CO304199.4	Apply professional and societal ethics in their day to day life.
CO304199.5	To become a responsible professional having social, economic and administrative considerations.
CO304199.6	: To make own career goals and personal aspirations

Mini Project

At the end of this course, Students will be able to

CO304200.1	Understand, plan and execute a Mini Project with a team.
CO304200.2	Implement electronic hardware by learning PCB artwork design, soldering techniques, testing and troubleshooting etc.
CO304200.3	Prepare a technical report based on the Mini project.
CO304200.4	Deliver technical seminar based on the Mini Project work carried out.

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Subject 1: Radiation & Microwave Theory

At the end of this course, Students will be able to

CO404181.1	Implement fundamental theory of radiation
CO404181.2	Identify various modes in the waveguide. Compare: coaxial line, rectangular waveguides & striplines and identify applications of the same
CO404181.3	Explore construction and working of principles passive microwave devices/components.
CO404181.4	Explore construction and working of principles active microwave devices/components.
CO404181.5	Analyze the structure, characteristics, operation, equivalent circuits and applications of various microwave solid state active devices
CO404181.6	Know the various microwave systems, devise set ups of microwave measurement devices and Identify the effect of radiations on environmental sustainability.

VLSI Design and Technology

At the end of this course, Students will be able to

CO404182.1	Develop effective HDL codes for digital design.
CO404182.2	Apply knowledge of real time issues in digital design.
CO404182.3	Model digital circuit with HDL, simulate, synthesis and prototype in PLDs.
CO404182.4	Design CMOS circuits for specified applications.
CO404182.5	Analyze various issues and constraints in design of an ASIC
CO404182.6	Apply knowledge of testability in design and Build InSelf Test (BIST) circuit.

Cloud Computing

At the end of this course, Students will be able to

CO404183.1	Understand the basic concepts of Cloud Computing
CO404183.2	Describe the underlying principles of different Cloud Service Models.
CO404183.3	Classify the types of Virtualization.
CO404183.4	Examine the Cloud Architecture and understand the importance of Cloud Security.
CO404183.5	Develop applications on Cloud Platforms.
CO404183.6	Evaluate distributed computing and the Internet of Things

Elective – 3 PLC SCADA & Automation

At the end of this course, Students will be able to

CO404184.1	Understand and Recognize Industrial Control Problems.
CO404184.2	Analyze & explain different hardware functions of PLC.
CO404184.3	Develop Ladder Programming in PLC and PLC Interface in real time applications.
CO404184.4	Explore and interpret functionality of SCADA.
CO404184.5	Identify and interpret the functionality of DCS.
CO404184.6	Define and explain CNC machines and Applications of Industrial Protocols.

Elective – 3 JAVA Script

At the end of this course, Students will be able to

CO 404184.1	Use basic features of java script.
CO 404184.2	Use relevant data types for developing application in java script.
CO 404184.3	Use the function and objects as self-contained, with data passing in and out through well-defined interfaces in development of small systems.
CO 404184.4	Apply the regular expression for Text matching and manipulation.
CO 404184.5	Explore use of the various aspects of JavaScript object models that are fundamental to the proper use of the language.
CO 404184.6	Develop the application using windows controlling and form handling

Elective – 3 Modernized IoT

At the end of this course, Students will be able to

CO404184.1	Comprehend and analyze concepts of sensors, actuators, IoT and IoE.
CO404184.2	Interpret IoT Architecture Design Aspects.
CO404184.3	Comprehend the operation of IoT protocols.
CO404184.4	Describe various IoT boards, interfacing, and programming for IoT.
CO404184.5	Illustrate the technologies, Catalysts, and precursors of IIoT using suitable use cases.
CO404184.6	Provide suitable solution for domain specific applications of IoT.

Elective – 4 Data Mining

At the end of this course, Students will be able to

CO404185.1	Understand the process of data mining and performance issues in data mining
CO404185.2	Apply data preprocessing techniques to the historical data collected in data warehouse
CO404185.3	Analyze various types of Frequent pattern analysis methods and advanced Pattern mining techniques
CO404185.4	Evaluate various data mining algorithms for developing effective data mining models
CO404185.5	Analyze different clustering and outlier detection methods
CO404185.6	Design data mining models in different mining application areas

Fiber Optic Communication

At the end of this course, Students will be able to

CO404190.1	Explain the working of components and measurement equipments in optical fiber networks.
CO404190.2	Calculate the important parameters associated with optical components used in fiber optic telecommunication systems.
CO404190.3	Compare and contrast the performance of major components in optical links.
CO404190.4	Evaluate the performance viability of optical links using the power and rise time budget analysis.
CO404190.5	Design digital optical link by proper selection of components and check its viability using simulation tools.
CO404190.6	Compile technical information related to state of art components, standards, simulation tools and current technological trends by accessing the online resources to update their domain knowledge.

Elective – 5 Mobile Computing

At the end of this course, Students will be able to

CO404191.1	Understand concepts of Mobile Communication.
CO404191.2	Analyse next generation Mobile Communication System.
CO404191.3	Understand network layers of Mobile Communication.
CO404191.4	Understand IP and Transport layers of Mobile Communication
CO404191.5	Study of different mathematical models.
CO404191.6	Understand different mobile applications

Elective - 6 Digital Marketing

At the end of this course, Students will be able to

CO404192.1	Design websites using free tools like Wordpress and explore it for digital marketing..
CO404192.2	Apply various keywords for a website & to perform SEO
CO404192.3	Understand the various SEM Tools and implement the Digital Marketing Tools.
CO404192.4	Illustrate the use of Facebook, Instagram and Youtube for Digital Marketing in real life.
CO404192.5	Use Linked in platform for various campaigning. CO6: Understand the importance of recent trends in digital marketing.

Innovation & Entrepreneurship

At the end of this course, Students will be able to

CO404193.1	Understand Innovation, Entrepreneurship and characteristics of an entrepreneur.
CO404193.2	Develop a strong understanding of the Design Process and its application in variety of business settings.
CO404193.3	Generate sustainable ideas.
CO404193.4	Explore various processes required to be an entrepreneur.
CO404193.5	Understand patents and its process of filing.
CO404193.6	Choose and use appropriate social media for marketing.

Digital Business Management

At the end of this course, Students will be able to

CO404194.1	Identify drivers of digital business.
CO404194.2	Illustrate various approaches and techniques for E-business and management.
CO404194.3	Prepare E-business plan

Project Stage – I & II

At the end of this course, Students will be able to

CO404188.1& CO404197.1	Define, analyze and solve complex real life problem.
CO404188.2& CO404197.2	Work in collaborative team as a member or leader.
CO404188.3& CO404197.3	Apply project management techniques.
CO404188.4& CO404197.4	Identify and apply appropriate tools.
CO404188.5& CO404197.5	Communicate effectively in verbal and written form.
CO404188.6& CO404197.6	Imbibe ethical practices.